Exploration of Neuroscience

Open Exploration

Open Access Review

Pain management in Guillain-Barré Syndrome: a literature review

Kyla D. Groves[1†*], Alexander M. Preisig[2†*], Alexander Aldanese[3], Kunal Aggarwal[4]

[1]Department of Medicine, St. George's University School of Medicine, True Blue, Grenada
[2]Department of Medicine, Ross University School of Medicine, Bridgetown 11093, Barbados
[3]Department of Anesthesiology, Sutter Roseville Medical Center, Roseville, CA 95661, USA
[4]Department of Physical Medicine and Rehabilitation, Montefiore Einstein Medical Center, Bronx, NY 10467, USA

[†]These authors contributed equally to this work.
***Correspondence:** Kyla D. Groves, Department of Medicine, St. George's University School of Medicine, True Blue, Grenada. kyla.groves97@gmail.com; Alexander M. Preisig, Department of Medicine, Ross University School of Medicine, Bridgetown 11093, Barbados. alexmp.1994@yahoo.com
Academic Editor: Giustino Varrassi, President of the Paolo Procacci Foundation, Italy
Received: August 14, 2025 **Accepted:** October 13, 2025 **Published:** October 28, 2025

Cite this article: Groves KD, Preisig AM, Aldanese A, Aggarwal K. Pain management in Guillain-Barré Syndrome: a literature review. Explor Neurosci. 2025;4:1006114. https://doi.org/10.37349/en.2025.1006114

Abstract

Guillain-Barré Syndrome (GBS) is a rare cause of acute, flaccid paralysis and affects populations around the world, usually in the setting of recent gastrointestinal infection. The myelin sheaths of affected patients are destroyed, and consequently, the disease can manifest variably with the most common complaints including weakness, disturbances in sensation, and pain. Multiple available pharmacotherapies are employed to address disease progression and promote the reversal of symptoms. However, there is no widely accepted guideline detailing tiers of pain management options, despite pain being a significant primary complaint during the acute phase of the disease. To address this, we searched the GBS literature for publications that specifically discussed patient pain, how the pain was managed by the clinician, and how patients responded to various modalities. We discuss the findings of the literature review we conducted, evaluate the expansive list of existing options for treating pain and how they fared in symptom resolution, and draw conclusions based on our observations of which interventions addressed patient pain effectively and which were less successful. While general management of GBS, including treatment and efforts towards symptom reversal, has been robustly discussed in the literature, our work stresses the lack of research towards pain management in GBS and emphasizes the need to fill the gap in patient care for patients with this disease.

Keywords

Guillain-Barré Syndrome, neuropathic pain, pain management, gabapentin, carbamazepine

Introduction

Guillain-Barré Syndrome (GBS) is the most common cause of acute, flaccid paralysis and affects approximately 100,000 people worldwide every year [1]. It can affect people at any age, but incidence

increases with age: patients tend to be in their sixth or seventh decades when the disease manifests [1]. Furthermore, males are 1.5 times more likely to be affected than females [1].

GBS is a rare autoimmune disorder characterized by the reversible destruction of the myelin sheath in the peripheral nervous system [2]. This demyelination leads to the rapid onset of muscle weakness, paralysis, and varying degrees of sensory disturbances, starting at the distal limbs and progressing proximally in what is referred to as "ascending paralysis" [2]. GBS often follows infection by certain microorganisms, such as *Campylobacter jejuni*, Epstein-Barr virus, cytomegalovirus, and *Mycoplasma pneumoniae* [2]. Several subtypes of GBS have been classified, including acute inflammatory demyelinating polyneuropathy, acute motor axonal neuropathy (AMAN), Miller Fisher Syndrome (MFS), and acute motor sensory axonal neuropathy (AMSAN) [3]. Manifestations of GBS are broad and include weakness, cranial nerve dysfunction, respiratory insufficiency, sensory disturbances, autonomic dysfunction, and pain [1].

Pain associated with GBS may arise from several pathological mechanisms. While no single cause has been definitively identified, proposed contributors include inflammation, damage to sensory fibers, and broader inflammatory responses [4]. Regardless of the underlying mechanism, GBS-associated pain can present in various forms, including neuropathic, musculoskeletal, and visceral, with different types more commonly occurring at different phases of the disease [3].

Patients often describe neuropathic pain as spontaneous or as continuous burning, pricking, or squeezing sensations; all of which can be easily triggered by light touch or cold stimuli [5]. The International Association for the Study of Pain (IASP) recently redefined neuropathic pain as 'pain that arises as a direct consequence of a lesion or disease affecting the somatosensory system', emphasizing how the somatosensory system must be disrupted and how the lesion must be located within it [5, 6]. Radicular pain may feel similar, but the key difference lies in the location of the lesion: radiculopathy involves damage to a nerve root, whereas neuropathy involves damage to peripheral nerves. On the contrary, musculoskeletal pain in GBS is often described as similar to post-exercise muscle fatigue, though it may also present as deep aching or cramping, typically worsening at night [7]. In addition, some patients may experience joint pain as part of their symptom profile. In the acute phase of GBS, pain is commonly located in the lower back and may persist for months [8].

A plethora of assessments has been employed to evaluate and categorize pain in patients with GBS. Ruts et al. [9] used the simplified version of the Dutch McGill Pain Questionnaire to assess the character of pain. Swami et al. [10] screened participants for neuropathic pain using the pain-DETECT Questionnaire, a nine-item questionnaire measuring pain quality, chronology, and radiation. Pain can also be assessed using tools like a 5-point or visual analog scale [11]. These assessments are clinically important because pain is one of the most common complaints reported among all subtypes, with an estimated 89% of patients reporting pain throughout disease progression [3]. Unfortunately, evidence-based guidelines on optimal pain management in these patients are scarce.

We have discussed a review of the available publications and observations on how the existing repertoire of pharmacotherapies has been used to manage GBS pain. In this literature review, we aimed to consolidate pain management options for patients with GBS. This review differs from what currently exists in the literature by focusing only on pain management in patients with GBS, which appears to be both a major concern and an under-researched problem in this cohort. By reviewing and synthesizing available evidence, we hope to provide a more standardized approach to pain management that can be applied in clinical practice, ultimately improving the quality of care for these patients.

Methods

While the literature pertaining to GBS is fairly comprehensive, information evaluating specifically pain management is limited. To conduct our literature review, we scoured available publications that elaborated on how the pain seen in patients with GBS was managed, which agents were used, and how the patients responded to the pain. We did not include or expand upon studies that evaluated the other symptoms seen

in GBS, including, but not limited to, sensory deficits and weakness, and did not include discussion or mention of pain management.

Literature review

The final list of publications, which are summarized in Table 1, contains twenty-two publications. All of them met the inclusion criteria because of how they describe pain management. Table 1 shows a summary and quick reference of the analgesics and the authors/researchers that are discussed in the following literature review.

Table 1. Summary of interventions to manage pain in patients with GBS.

Author(s)	GBS subtype	Treatment type	Agents/Approach	Effectiveness/Notes
Peña et al./2015 [11]	Not specified	Neuropathic agents	Carbamazepine	Reduced pain and need for rescue opioids like fentanyl/pethidine
Pandey et al./2005 [15]	Not specified	Neuropathic agents	Gabapentin, carbamazepine	Gabapentin is more effective than carbamazepine, reduces fentanyl use significantly
Pandey et al./2002 [16]	Not specified	Neuropathic agents, opioids	Gabapentin, fentanyl	Less fentanyl consumption during gabapentin periods than during placebo periods
Khatri & Pearlstein/1997 [14]	Not specified	Neuropathic agents	Gabapentin (100 mg TID; 300 mg BID)	Effective pain relief, well-tolerated; recommended in GBS pain management
Ritter et al./2023 [13]	MFS secondary to SARS-CoV-2 infection	Antidepressants, neuropathic agents	Amitriptyline, pregabalin, gabapentin	Gabapentinoids were ineffective; pain resolved with amitriptyline, relapse of pain on taper
Liu et al./2015 [3]	Not specified	Neuropathic agents	Gabapentin, carbamazepine	Both were effective vs. placebo, but no definitive recommendation due to study limitations
Tripathi & Kaushik/2000 [17]	Not specified	Neuropathic agents	Carbamazepine	Lower pain scores and reduced opioid (pethidine) needs; carbamazepine is recommended for ICU patients
McDouall & Tasker/2004 [18]	Not specified	Neuropathic agents vs. opioids	Carbamazepine	Argued that carbamazepine is as effective for neuropathic pain as opioids, with fewer side effects (sedation, ventilation delay)
Ali & Hutfluss/1992 [19]	Not specified	Epidural analgesia	Epidural bupivacaine + fentanyl	Significant visual analog scale reduction (9 → 2) and improved mobility
Morgenlander et al./1990 [20]	Not specified	Topical neuropathic agent	Capsaicin 0.075% q6h	Provided relief after failure of multiple agents; recurrence of pain on discontinuation
Koga et al./2000 [21]	MFS	NSAIDs, neuropathic	NSAIDs, carbamazepine	Neither class was effective for pain relief in their cohort
Connelly et al./1990 [22]	Not specified	Epidural opioids	Fentanyl (epidural), then morphine	Epidural opioids are effective where IV opioids and other agents have failed
Genis et al./1989 [23]	Not specified	Epidural opioids	Epidural morphine (1–4 mg q8–24h)	8/9 patients responded positively: they were pain-free during the day and slept at night
Johnson & Dunn/2008 [24]	Not specified	Opioids	Remifentanil infusion	Effective for 14 days with no significant tolerance
Ruts et al./2007 [25]	Radicular pain, GBS subtype not specified	Corticosteroids	Methylprednisolone + IVIg	Mixed results; radicular pain improved in most patients. A small sample size limits the ability to draw a definitive conclusion
van Doorn et al./2013 [26]	Not specified	Corticosteroids	High-dose steroids	EAN-PNS weakly recommends against high-dose corticosteroids
Hodgeman et al./2021 [28]	Not specified	IVIg + plasmapheresis	142 g IVIg over 4 days	Gradual pain reduction; successful outcome
Ding et al./2018 [29]	Suspected GBS subtypes	IVIg	IVIg 0.4 mg/kg/day × 5 days	Significant pain improvement and symptom resolution in both cases

Table 1. Summary of interventions to manage pain in patients with GBS. (*continued*)

Author(s)	GBS subtype	Treatment type	Agents/Approach	Effectiveness/Notes
Nixon/1978 [30]	Not specified	Miscellaneous	Quinine sulfate ± aminophylline	Nocturnal cramping pain relief lasting 8–12 h
Kiper et al./2025 [31]	Not specified	Non-pharmacotherapy: physical therapy	Strength, ROM, functional training, aerobic	Improved function, fatigue, strength, and well-being
Al-Zamil et al./2024 [32]	Post-COVID GBS + ATM	Non-pharmacotherapy	TENS	Pain improvement; enhanced mobility and nerve function
Sendhilkumar et al./2013 [33]	Not specified	Non-pharmacotherapy: yoga, meditation	Pranayama yoga, meditation + rehab	Trend toward pain improvement; not statistically significant
Titus et al./2024 [34]	Sensory GBS	Multimodal	Hydromorphone, lorazepam, gabapentin	Refractory pain required escalation; emphasized individualized approaches

MFS: Miller-Fischer Syndrome; GBS: Guillain-Barré Syndrome; ATM: acute transverse myelitis; NSAIDs: non-steroidal anti-inflammatory drugs; IVIg: intravenous immunoglobulin; TID: three times a day; BID: twice a day; TENS: transcutaneous electrical nerve stimulation; EAN-PNS: European Academy of Neurology and the Peripheral Nerve Society.

There is a significant variety among prescribed analgesics in patients with GBS, with no gold standard option. The selection includes non-steroidal anti-inflammatory drugs (NSAIDs), opioids, anticonvulsants, antidepressants, corticosteroids, and immunoglobulins. In 2015, the IASP published guidelines for the pharmacological treatment of neuropathic pain [12]. They recommended tricyclic antidepressants, gabapentinoids, and serotonin-norepinephrine reuptake inhibitors as the first-line agents for patients with neuropathic pain [5]. A Task Force by the European Academy of Neurology and the Peripheral Nerve Society (EAN-PNS) published recommendations about GBS in 2023, including pain treatment. They weakly recommended using gabapentin or carbamazepine for pain treatment. Additionally, they advised prescribing a gabapentinoid or a tricyclic antidepressant first before treating with carbamazepine [1]. However, the standardization of these agents as first-line for patients with neuropathic pain due to GBS is yet to be made. Table 1 shows a concise summary of the analgesics discussed below.

Neuropathic pain agents

Multiple studies have demonstrated how medications such as gabapentin, pregabalin, and carbamazepine can significantly reduce the severity of pain in GBS patients compared to placebo. Patients taking gabapentin also scored lower on the visual analog scale relative to those taking carbamazepine. A case-control study discussed by Peña et al. [11] reported a significant reduction in both pain and the need for rescue therapies, such as pethidine or fentanyl, in patients treated with carbamazepine. Another study comparing gabapentin to carbamazepine in ICU patients with GBS found a greater reduction in pain intensity among those receiving gabapentin [11].

Liu et al. [3] evaluated three randomized controlled trials, which included a total of 277 participants who were randomly assigned to receive different treatments. Two of these studies compared the efficacy of pain resolution of gabapentin or carbamazepine with that of a placebo. While the authors were unable to recommend a definitive treatment due to the limitations of their work, they found that both gabapentin and carbamazepine were effective in reducing pain in patients with GBS compared with those who were given a placebo.

Ritter et al. [13] described a case in which a female patient presented with GBS, specifically MFS, secondary to infection with SARS-CoV-2 and subsequently experienced intractable allodynia. She was hospitalized for several months and started on a treatment plan which included amitriptyline 75 mg at night, hydroxyzine 25 mg three times a day (TID), and tramadol 50 mg twice a day (BID). Of all the agents prescribed to this patient over her progression as described in their report, amitriptyline was found to be the most responsive agent: attempts to wean off of it resulted in worsening pain [13]. Of note, this patient had received a regimen that consisted of pregabalin and gabapentin, which were unsuccessful in pain resolution [13].

Khatri and Pearlstein [14] reported two instances of treating GBS pain with gabapentin. One of their patients was treated with a 100 mg dose TID. The other was prescribed a 300 mg dose BID. Khatri and Pearlstein [14] asserted that not only was gabapentin an excellent choice for pain, as demonstrated by the alleviation of pain in both patients, but also argued it should be included in pain management for patients with GBS due to its tolerance and safety profile.

Pandey et al. [15] investigated thirty-six patients with GBS in the intensive care unit. The patients were randomly assigned courses of gabapentin 300 mg TID, carbamazepine 100 mg TID, or a matching placebo, for a total of seven days. Additionally, fentanyl at a dose of two micrograms per kilogram was administered in addition if requested by patients. There was no significant difference in fentanyl administration among the gabapentin and carbamazepine groups on day one, but both groups had less fentanyl consumption on day one than in the placebo group. From day two onwards, significantly less fentanyl was administered for all three groups, and it was minimal in the gabapentin group. It was concluded that gabapentin is more effective in decreasing pain in these patients than carbamazepine [15]. Pandey et al. [16] also published a double-blinded, placebo-controlled, crossover study with eighteen patients to determine the efficacy of gabapentin in the treatment of GBS requiring ventilatory support. These patients were assigned to receive either gabapentin or a placebo and were offered fentanyl as a secondary analgesic for a trial length of seven days. After a two-day washout period, the groups switched and received the other option. The consumption of fentanyl significantly decreased for patients during their respective gabapentin periods, which argues in favor of gabapentin being an effective treatment option in this patient cohort [16].

Tripathi and Kaushik [17] evaluated carbamazepine as a pain management option for GBS patients in the intensive care unit. In a randomized, double-blind, crossover study, they enlisted twelve patients with severe backache and assigned them to either the carbamazepine or placebo groups. If the carbamazepine dose of 100 mg every eight hours or the placebo was inadequate, patients could request intravenous pethidine at a dose of one milligram per kilogram as an adjunct. They found that pain scores were lower in the carbamazepine group than in the placebo group, and significantly higher amounts of pethidine were administered on the placebo days. Tripathy and Kaushi [17] concluded by recommending that carbamazepine be included in the pain management regimen for GBS patients in the intensive care unit to minimize opioid consumption.

McDouall and Tasker [18] went on to assess the studies put forward by Pandey et al. [16] in 2002 and by Tripathi and Kaushik [17] in 2000 to argue how carbamazepine is at least as effective as opioids in the treatment of neuropathic pain in GBS. Their conclusion is based on what they observed in the trials referenced: how smaller quantities of opiates were required to manage patient pain, and how patients reported less subjective pain when they answered pain scales [18]. They also pointed out an added benefit of anticonvulsants over opioids by indicating how opioid requirements are reduced, lessening sedation and other side effects that accompany opioids. Improvement in sedation scores, they concluded, can result in less time weaning from mechanical ventilation [18].

Ali and Hutfluss [19] successfully addressed the pain of a GBS patient by administering bupivacaine via an epidural. The patient exhibited generalized positional pain and lower extremity pain. She was given an epidural infusion combination of bupivacaine 15 mg per hour and fentanyl 75 micrograms per hour. Following this treatment, her rating on the visual analog scale decreased from nine to two, and her mobility improved [19].

Morgenlander et al. [20] described the progression of a 25-year-old woman who was transferred to her care and markedly improved following the initiation of capsaicin treatment. The initial treatments of acetaminophen, ibuprofen, piroxicam, amitriptyline, and carbamazepine were unable to reduce the severe, constant aching and burning sensation in the patient's feet. The administration of methadone 5 mg every six hours was minimally effective as well. Following two months of hospitalization, she was treated with capsaicin 0.075% topically every six hours to her feet and ankles bilaterally. This provided relief after four days of treatment. In the subsequent two months after capsaicin initiation, two attempts at discontinuation led to pain return and readministration of capsaicin therapy [20].

Based on these reports, the authors believe that gabapentin should be included as one of the first-line medications for pain management. Carbamazepine should be considered as well. These agents have demonstrated consistent effectiveness in many cases of GBS, and additional research incorporating them could help refine and strengthen future treatment guidelines.

Non-steroidal anti-inflammatory drugs

NSAIDs are among the most commonly prescribed analgesics for GBS pain; however, they are not consistently effective [3]. Koga et al. [21] found that oral NSAIDs were inadequate for pain relief in most of the twenty-seven patients enrolled in their study. Furthermore, they indicated how carbamazepine was also ineffective for their patients [21].

Despite the limited available publications, the authors do not recommend NSAIDs as part of the treatment plan for patients with GBS.

Opioids

Besides NSAIDs, opioids are also commonly prescribed for GBS pain. Like NSAIDs, they are not consistently effective for all categories of pain, as the different types are provoked by different mechanisms [3]. Their use is limited by this, as well as safety concerns and the known risk of addiction for this drug class [3].

Connelly et al. [22] presented a case report of a 34-year-old female who arrived at the emergency department with lower back pain that progressed to weakness and paresthesias in her lower extremities. She was diagnosed with GBS and admitted for further management. The patient experienced severe, difficult-to-manage pain, describing it as deep and sharp in her lower back and legs, along with a burning sensation in her feet. Various treatment regimens, including intravenous opioids, phenytoin, carbamazepine, and transcutaneous nerve stimulation, were trialed without relief. Fluphenazine provided some benefit but led to adverse effects, including visual hallucinations and dyskinesias. Based on positive results from a previous report, the care team placed an epidural catheter for opioid administration. Fentanyl was used initially, then transitioned to intermittent morphine injections, followed by a continuous morphine infusion, which achieved adequate analgesia. The patient received epidural opioids for thirty-seven days, followed by three days of oral opioids. Although she continued to report a burning sensation in her feet, the pain was tolerable. While other medications, such as tricyclic antidepressants, local anesthetics, and phenothiazines, were not trialed in this case, their use via the epidural route may warrant further study, especially as a means to reduce opioid exposure and the risk of dependence.

Although not the first report demonstrating the efficacy of epidural opioids, Connelly et al.'s case [22] highlights an important distinction: epidural administration may be particularly effective for certain types of GBS-related pain. Further investigation is needed to identify which symptoms most respond to this approach [22]. An argument for epidural opioid use is supported by Genis et al.'s study [23], in which nine patients who were unresponsive to multiple other pharmacotherapies were treated with morphine chloride. Treatment was with morphine chloride at a dose ranging from 1 mg to 4 mg via epidural bolus injection at intervals, including every eight, twelve, or twenty-four hours, depending on the patient. Eight of the nine patients endorsed a positive response: their pain resolved during the day, and they could sleep at night.

Johnson and Dunn [24] described the case of a 21-year-old female who failed seven pharmacotherapies due to either insufficient pain relief or excessive sedation. She was started on remifentanil at a rate of 0.1 microgram per kilogram per minute before increasing to 0.15. This regimen provided sufficient pain relief, and she proceeded to receive remifentanil for fourteen days without developing significant tolerance [24].

Opioids are known to be effective analgesic agents. However, the authors do not recommend their employment at this time. Even though patients may endorse pain relief, the side effects and abuse potential associated with this drug class can be avoided with other pharmacotherapies.

Corticosteroids

Given the potential for recurrent or prolonged disease activity in some patients, alternative or adjunctive treatments such as corticosteroids have been explored. Corticosteroids are thought to reduce pain and inflammation by dampening the immune system activity. However, evidence supporting their use in GBS is mixed. Ruts et al. [25] conducted a randomized, placebo-controlled trial comparing intravenous immunoglobulin (IVIg) plus methylprednisolone (500 mg for five days) with IVIg plus placebo. The study found no significant difference in pain reduction between the groups. Nonetheless, the authors acknowledged that other studies have reported potential benefits of corticosteroids, particularly for specific pain phenotypes such as radicular pain [25].

The Ruts et al.'s study [25] showed that ten out of thirty-nine patients experienced radicular pain. All five patients treated with methylprednisolone reported improvement, as did four of the five in the placebo group. Despite this encouraging response, the small sample size limits the ability to draw definitive conclusions regarding corticosteroid efficacy for radicular pain in GBS [25]. These findings highlight the complexity of pain management in GBS and underscore the need for individualized treatment approaches based on symptom patterns and disease progression.

It is mentioned by van Doorn et al. [1] that the EAN-PNS Task Force weakly recommends against the use of high-dose corticosteroids; however, the rationale behind this is not expanded upon further.

While corticosteroids may be administered as part of disease management, the authors do not recommend this drug class when managing patient pain.

Intravenous immunoglobulin

IVIg is the preferred treatment for GBS and for certain variants such as MFS and AMAN [26]. Its therapeutic effect is thought to result from elevated serum IgG levels, which help modulate the autoimmune response [26]. While IVIg is generally effective, approximately 10% of patients experience treatment-related fluctuations, defined as secondary clinical deterioration within about eight weeks after initial improvement [26]. These cases often require a second course of IVIg, which can lead to symptom resolution [26]. However, some patients may experience ongoing nerve damage due to a prolonged immune response or multiple episodes of deterioration [26]. In such scenarios, clinicians should consider alternate diagnoses, such as acute-onset chronic inflammatory demyelinating polyradiculoneuropathy (A-CIDP) [26]. The standard regimen of 0.4 milligrams per kilogram for five days has also replaced plasma exchange at many facilities because of its convenience and availability [27].

Hodgeman et al. [28] were able to treat their 57-year-old patient with IVIg and plasmapheresis. The patient presented with severe pain located in the lower back and the extremities [28]. Following diagnosis via a lumbar puncture, 142 grams of IVIg were administered over four days, which led to a gradual reduction in pain [28].

Ding et al. [29] had similar successes with their cases following IVIg administration. One case described a 64-year-old woman, and another described a 76-year-old woman. Both patients endorsed severe lower back and bilateral lower extremity pain, as well as bladder dysfunction. In both cases, electrophysiological studies were obtained: acute polyradiculoneuropathy was revealed in both patients. Subtypes of GBS were suspected, and both patients were started on IVIg at a rate of 0.4 milligrams per kilogram per day for five days. The patients endorsed significant improvement of symptoms, and neither had any follow-up concerns [29].

The authors acknowledge the role of IVIg in GBS treatment and suspect that pain alleviation in those who receive IVIg is due to disease treatment rather than addressing pain specifically.

Miscellaneous pharmacotherapies

Nixon [30] reported treating three of his patients with quinine sulfate. The patients experienced severe cramping pain in the lower back and extremities that was worse at night and interfered with sleep. One of

the patients received quinine sulfate 300 mg, while the other two received a combination of quinine sulfate 260 mg and aminophylline 195 mg. All three patients reported relief of symptoms lasting eight to twelve hours without displaying evidence of quinine toxicity. Furthermore, attempts to substitute quinine sulfate with other analgesic options led to insufficient pain relief in these patients [30].

Non-pharmacological therapies

While data specifically addressing pain relief through physical therapy in patients with GBS are limited, physical therapy remains a valuable component of their overall care. A scoping review by Kiper et al. [31] highlighted positive effects of physical therapy on functional independence, strength, fatigue, and general well-being in this population. Some studies examined exercise interventions combining strength training, range of motion exercises, and functional training without incorporating aerobic activity. In contrast, others utilized aerobic training alongside strength, balance, and functional exercises [31]. The optimal approach to exercise and physical therapy in GBS, particularly individualized treatment plans, remains understudied and represents a promising area for future research.

Al-Zamil et al. [32] highlight the potential benefit of using combined treatment approaches in the early stages of GBS, particularly incorporating transcutaneous electrical nerve stimulation (TENS). They present a case report of a patient with post-COVID GBS overlapping with acute transverse myelitis (ATM). TENS was initiated sixty-one days after disease onset and thirty-two days after completing plasma exchange. The patient experienced complete resolution of neuropathic pain in the upper extremities and a 50% reduction in the lower extremities. Paresthesias decreased by 60% in the upper extremities and 57% in the lower extremities. Additional improvements included increased mobility, improved gait, and reduced bladder and bowel dysfunction. Electromyography showed increased compound muscle action potentials, suggesting axonal regeneration and functional recovery of both motor and sensory nerves [32].

While the case demonstrates promising outcomes, the authors note insufficient evidence to support TENS as a stand-alone therapy [32]. However, when combined with pharmacotherapy and plasma exchange, the addition of TENS resulted in an 89.5% enhancement in therapeutic effect [32].

Sendhilkumar et al. [33] conducted a randomized controlled trial with twenty-two patients to assess the effect of pranayama yoga and meditation in the alleviation of pain in conjunction with other therapies. They found that reported pain scores decreased in the yoga group without statistical significance [33]. Furthermore, the findings published by the EAN-PNS Task Force determined that they could not make a recommendation in favor of or against pranayama yoga and meditation in the treatment of GBS-related pain [1]. The Task Force's publication also concluded that while some studies have described yoga in managing GBS pain, little evidence of efficacy is available [1].

At this time, there is not enough evidence to recommend for or against the use of non-pharmacological interventions in the treatment of GBS-related pain.

Multimodal management approaches

Medicine is rarely a one-size-fits-all discipline, particularly in managing GBS. Individualized treatment plans are often necessary and may require multimodal approaches. Titus et al. [34] present a case report of a 52-year-old male who developed progressive bilateral leg weakness and neuropathic pain following a flu-like illness. During his two-week hospitalization, he underwent six sessions of plasmapheresis. The treatment was complicated by debilitating neuropathic pain in his extremities. Initial management with standard therapies, including NSAIDs, methocarbamol, gabapentin, and lidocaine patches, was unsuccessful. Additional agents such as pregabalin, carbamazepine, duloxetine, oxycodone, and baclofen were trialed without sufficient relief. Significant symptom control was finally achieved with a regimen combining hydromorphone 0.5 mg and lorazepam 1 mg administered every four hours, supplemented by gabapentin [34]. This case highlights that first-line therapies may not always be effective and underscores the importance of exploring alternative and individualized treatment strategies in complex cases.

Pain management across disease phases

The progression of GBS has been classified into three phases: acute, subacute or recovery, and chronic. The acute phase is defined as the first three weeks after disease onset [4]. The overwhelming majority of what is found in the literature evaluates pain in the acute phase of the disease. What appears to be the most effective in addressing the pain is IVIg and gabapentin. Neither NSAIDs nor corticosteroids are as effective and are therefore not considered first-line treatment.

Similar to the acute phase, pain in the recovery phase, referred to as the subacute phase, may be severe and may precede the onset of weakness [1]. While pain management specific to the subacute phase is not directly addressed in the literature, the Task Force does recommend asking patients about their pain in the recovery phase without delineating which agents should be used specifically for this phase [1].

The chronic or convalescent phase begins three months following disease onset [3]. There are some publications available investigating the use of antiepileptics in chronic non-GBS diseases such as fibromyalgia [35, 36]. However, the quantity of evidence in the literature evaluating pain in the chronic phase of GBS is limited. The Task Force remarked how there is currently no clear indication that neuropathic pain due to GBS should be treated differently from neuropathic pain due to other nerve diseases [1].

Discussion

This literature review highlights the importance of the different severities of pain associated with the different phenotypes of GBS, but also the inadequacy of existing guidelines to address long-term pain management strategies. Further study should take place to discover the potential utilization of the roles of different GBS subtypes in the expression of pain and treatment response. We have found that the literature frequently generalizes pain management across all forms of GBS. Our thorough review supports the need for subtype-specific strategies, as pain intensity and duration may differ significantly.

To address these gaps and guide more individualized care, pain management in GBS should be approached along three key dimensions: the disease phase (acute, recovery, and chronic), the underlying pain mechanism (neuropathic, musculoskeletal, or radicular), and the therapeutic strategy (pharmacologic, non-pharmacologic, or multimodal). Considering pain through this framework underscores both the diversity of potential interventions and the critical need for targeted research to identify the most effective approaches for each patient group.

From our review, it is readily apparent that there is a significant variety among the interventions employed to address pain. Pharmacotherapies ranged from commonly prescribed options, such as NSAIDs and neuropathic agents, to unique options such as capsaicin and bupivacaine. Some patients required trial-and-error techniques as their pain was refractory to much of what was administered. This cohort of GBS patients who suffer with significant pain would benefit from clear evidence-based guidelines on how clinicians should manage pain, and the diversity of modalities among the included publications highlights the absence of clear direction on how to approach this common symptom.

Another observation made from our literature review is the discrepancy in treatment among the disease phases. Pain in GBS is brought to clinical attention most frequently in the acute phase [25]. Consequently, the literature has significant gaps regarding how to manage pain in the chronic phase appropriately. Even the Task Force's recommendations refer to pain in the acute and recovery phases, and the chronic phase is absent [1]. This leaves a notable absence of standardized approaches to treatment and symptom relief for patients experiencing persistent or late-phase pain.

Other gaps in the literature and potential areas for future research include the integration of established treatment modalities such as physical therapy and cognitive behavioral therapy, as well as the exploration of non-traditional and potentially controversial therapies, like cannabinoids, ketamine, or TENS. While some case reports suggest potential benefit from these interventions, they are not yet part of standard practice and remain under-investigated in GBS populations.

The most significant limitation of our study is the lack of available data. Much of the literature about GBS is concerned with aspects of the disease treatment, such as reversal of neurological manifestations. Despite pain presenting as a major patient problem, the absence of standardized recommendations that provide a framework for clinicians to prescribe analgesics reflects the lack of investigations into this aspect of GBS patient care. Our extensive research of what has been published about GBS led us to include fewer than forty publications in our reference list, which underscores the lack of research into specifically GBS-related pain management.

Historically, GBS treatment has focused on addressing the weakness, paralysis, and respiratory dysfunction. The shift towards creating guidelines for pain management has yet to be fully fleshed out. Larger, high-quality clinical trials are necessary to confirm the efficacy of commonly used treatment modalities, leading to evidence-based guidelines. Further research should also consider how different subtypes of GBS may respond differently to treatment to develop subtype-specific guidelines. Patient-centered outcomes should also be addressed in future research, as functional outcomes (examples such as sleep, mobility, and quality of life) are often overlooked or underconsidered, as pain is the most focused-on ailment of GBS.

Conclusions

GBS is an autoimmune disease that manifests as nervous system-derived pathological derangements. Patients commonly experience pain, particularly in the acute phase of the disease.

To our knowledge, no standardized guidelines detailing the hierarchy of recommended analgesics exist for managing the pain endorsed by patients with GBS. Consequently, our efforts in describing and analyzing documented cases of interventions intended to resolve patient pain are meant to address this important gap in GBS patient care.

Our summaries of the available literature resulted in some observable patterns. In general, the patients who were provided with gabapentinoids or IVIg endorsed a reduction of perceived pain during the course of their disease. In contrast, NSAIDs and corticosteroids should be avoided as they were reported to be less effective. In many instances, clinicians documented successful treatment of pain when cocktails of analgesics were employed. While the large variety of treatment modalities indicates how GBS-related pain is broadly receptive to many agents, GBS is a common problem, and guidelines should be established for this patient population.

It is clear how GBS is managed, and there are options available to address neurological derangements. Future researchers should be aware of the significant gap in clear and effective pain management in this population and should direct their efforts accordingly. Our recommendations are derived from observable patterns found in existing publications, which we summarized in our literature review. However, due to the limited amount of evidence on this specific topic of pain management in patients with GBS, we cannot make standardized guidelines for clinicians to consult when treating GBS patients. We conclude by arguing in favor of more studies being conducted to address this important issue.

Abbreviations

AMAN: acute motor axonal neuropathy

BID: twice a day

EAN-PNS: European Academy of Neurology and the Peripheral Nerve Society

GBS: Guillain-Barré Syndrome

IASP: International Association for the Study of Pain

IVIg: intravenous immunoglobulin

MFS: Miller Fisher Syndrome

NSAIDs: non-steroidal anti-inflammatory drugs

TENS: transcutaneous electrical nerve stimulation

TID: three times a day

Declarations

Acknowledgments

During the preparation of this work, the author(s) used Grammarly and ChatGPT for improving readability and for grammatical correction. After using the tool/service, authors reviewed and edited the content as needed and took full responsibility for the content of the publication.

Author contributions

KDG: Writing—original draft, Writing—review & editing, Conceptualization, Data curation, Investigation. AMP: Writing—original draft, Writing—review & editing, Conceptualization, Data curation, Investigation. AA: Supervision, Writing—original draft, Writing—review & editing, Conceptualization, Data curation, Investigation, Project administration. KA: Writing—original draft, Conceptualization. All authors read and approved the submitted version.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Ethical approval

Not applicable.

Consent to participate

Not applicable.

Consent to publication

Not applicable.

Availability of data and materials

Not applicable.

Funding

Not applicable.

Publisher's note

References

1. van Doorn PA, van den Bergh PYK, Hadden RDM, Avau B, Vankrunkelsven P, Attarian S, et al. European Academy of Neurology/Peripheral Nerve Society Guideline on diagnosis and treatment of Guillain-Barré syndrome. Eur J Neurol. 2023;30:3646–74. [DOI] [PubMed]
2. Kumar V, Abbas AK, Aster JC. Robbins & Cotran Pathologic Basis of Disease. 10th ed. Amsterdam: Elsevier; 2021.

3. Liu J, Wang L, McNicol ED. Pharmacological treatment for pain in Guillain-Barré syndrome. Cochrane Database Syst Rev. 2015;2015:CD009950. [DOI] [PubMed] [PMC]
4. Yao S, Chen H, Zhang Q, Shi Z, Liu J, Lian Z, et al. Pain during the acute phase of Guillain-Barré syndrome. Medicine (Baltimore). 2018;97:e11595. [DOI] [PubMed] [PMC]
5. Finnerup NB, Kuner R, Jensen TS. Neuropathic Pain: From Mechanisms to Treatment. Physiol Rev. 2021;101:259–301. [DOI] [PubMed]
6. Neuropathic pain [Internet]. International Association for the Study of Pain (IASP); c2021 [cited 2022 October 19]. Available from: https://www.iasp-pain.org/advocacy/global-year/neuropathic-pain/
7. Newswanger DL, Warren CR. Guillain-Barré syndrome. Am Fam Physician. 2004;69:2405–10. [PubMed]
8. Bellanti R, Rinaldi S. Guillain-Barré syndrome: a comprehensive review. Eur J Neurol. 2024;31: e16365. [DOI] [PubMed] [PMC]
9. Ruts L, Drenthen J, Jongen JLM, Hop WCJ, Visser GH, Jacobs BC, et al.; Dutch GBS Study Group. Pain in Guillain-Barré syndrome: a long-term follow-up study. Neurology. 2010;75:1439–47. [DOI] [PubMed]
10. Swami T, Khanna M, Gupta A, Prakash NB. Neuropathic Pain in Guillain-Barre Syndrome: Association with Rehabilitation Outcomes and Quality of Life. Ann Indian Acad Neurol. 2021;24:708–14. [DOI] [PubMed] [PMC]
11. Peña L, Moreno CB, Gutierrez-Alvarez AM. Pain management in Guillain-Barre syndrome: a systematic review. Neurologia. 2015;30:433–8. [DOI] [PubMed]
12. Finnerup NB, Attal N, Haroutounian S, McNicol E, Baron R, Dworkin RH, et al. Pharmacotherapy for neuropathic pain in adults: a systematic review and meta-analysis. Lancet Neurol. 2015;14:162–73. [DOI] [PubMed] [PMC]
13. Ritter S, Gable D, May A, Darwish Y, Friedlander T. Intractable Neuropathic Pain in COVID-19-Induced Guillain-Barré Syndrome: A Case Report. Cureus. 2023;15:e36426. [DOI] [PubMed] [PMC]
14. Khatri A, Pearlstein L. Pain in Guillain-Barré syndrome. Neurology. 1997;49:1474. [DOI] [PubMed]
15. Pandey CK, Raza M, Tripathi M, Navkar DV, Kumar A, Singh UK. The comparative evaluation of gabapentin and carbamazepine for pain management in Guillain-Barré syndrome patients in the intensive care unit. Anesth Analg. 2005;101:220–5, table of contents. [DOI] [PubMed]
16. Pandey CK, Bose N, Garg G, Singh N, Baronia A, Agarwal A, et al. Gabapentin for the treatment of pain in guillain-barré syndrome: a double-blinded, placebo-controlled, crossover study. Anesth Analg. 2002;95:1719–23, table of contents. [DOI] [PubMed]
17. Tripathi M, Kaushik S. Carbamezapine for pain management in Guillain-Barré syndrome patients in the intensive care unit. Crit Care Med. 2000;28:655–8. [DOI] [PubMed]
18. McDouall SF, Tasker RC. Are anticonvulsants a satisfactory alternative to opiate analgesia in patients experiencing pain with Guillain-Barre syndrome? Arch Dis Child. 2004;89:686–7. [DOI] [PubMed] [PMC]
19. Ali MJ, Hutfluss R. Epidural fentanyl-bupivacaine infusion for management of pain in the Guillain-Barré syndrome. Reg Anesth. 1992;17:171–4. [PubMed]
20. Morgenlander JC, Hurwitz BJ, Massey EW. Capsaicin for the treatment of pain in Guillain-Barré syndrome. Ann Neurol. 1990;28:199. [DOI] [PubMed]
21. Koga M, Yuki N, Hirata K. Pain in Miller Fisher syndrome. J Neurol. 2000;247:720–1. [DOI] [PubMed]
22. Connelly M, Shagrin J, Warfield C. Epidural opioids for the management of pain in a patient with the Guillain-Barré syndrome. Anesthesiology. 1990;72:381–3. [DOI] [PubMed]
23. Genis D, Busquets C, Manubens E, Dávalos A, Baró J, Oterino A. Epidural morphine analgesia in Guillain Barré syndrome. J Neurol Neurosurg Psychiatry. 1989;52:999–1001. [DOI] [PubMed] [PMC]
24. Johnson DS, Dunn MJG. Remifentanil for pain due to Guillain-Barré syndrome. Anaesthesia. 2008;63: 676–7. [DOI] [PubMed]
25. Ruts L, van Koningsveld R, Jacobs BC, van Doorn PA. Determination of pain and response to methylprednisolone in Guillain-Barré syndrome. J Neurol. 2007;254:1318–22. [DOI] [PubMed] [PMC]

26. van Doorn PA. Diagnosis, treatment and prognosis of Guillain-Barré syndrome (GBS). Presse Med. 2013;42:e193–201. [DOI] [PubMed]
27. Hsia S, Lin J, Wu C, Huang I, Lin K. Guillain-Barré syndrome presenting as mimicking croup. Am J Emerg Med. 2010;28:749.e1–3. [DOI] [PubMed]
28. Hodgeman NT, Lowry LE, Graybill SD. Guillain-Barré Syndrome Presenting as an Acute Back Pain. Cureus. 2021;13:e17540. [DOI] [PubMed] [PMC]
29. Ding X, Jiang H, Hu X, Ren H, Cai H. Guillain-Barré Syndrome and Low Back Pain: Two Cases and Literature Review. Open Med (Wars). 2018;13:503–8. [DOI] [PubMed] [PMC]
30. Nixon RA. Quinine sulfate for pain in the Guillain-Barré syndrome. Ann Neurol. 1978;4:386–7. [DOI] [PubMed]
31. Kiper P, Chevrot M, Godart J, Cieślik B, Kiper A, Regazzetti M, et al. Physical Exercise in Guillain-Barré Syndrome: A Scoping Review. J Clin Med. 2025;14:2655. [DOI] [PubMed] [PMC]
32. Al-Zamil M, Kulikova NG, Minenko IA, Mansur N, Zalozhnev DM, Uzdenov MB, et al. Functional Recovery and Regenerative Effects of Direct Transcutaneous Electrical Nerve Stimulation in Treatment of Post-COVID-19 Guillain-Barré and Acute Transverse Myelitis Overlap Syndrome: A Clinical Case. J Funct Morphol Kinesiol. 2024;9:40. [DOI] [PubMed] [PMC]
33. Sendhilkumar R, Gupta A, Nagarathna R, Taly AB. Effect of pranayama and meditation as an add-on therapy in rehabilitation of patients with Guillain-Barré syndrome—a randomized control pilot study. Disabil Rehabil. 2013;35:57–62. [DOI] [PubMed]
34. Titus J, Sarmiento B, Crouse R. Management of Severe Pain in a Case of Sensory Guillain-Barre Syndrome. Cureus. 2024;16:e64432. [DOI] [PubMed] [PMC]
35. Wiffen PJ, Derry S, Moore RA, Kalso EA. Carbamazepine for chronic neuropathic pain and fibromyalgia in adults. Cochrane Database Syst Rev. 2014;2014:CD005451. [DOI] [PubMed] [PMC]
36. Wiffen PJ, Derry S, Moore RA, Aldington D, Cole P, Rice ASC, et al. Antiepileptic drugs for neuropathic pain and fibromyalgia - an overview of Cochrane reviews. Cochrane Database Syst Rev. 2013;2013: CD010567. [DOI] [PubMed] [PMC]